



**Howard County
Health Department**

Maura J. Rossman, M.D., Health Officer

Bureau of Environmental Health
8930 Stanford Boulevard, Columbia, MD 21045
Main: 410-313-2640 | Fax: 410-313-2648
TDD 410-313-2323 | Toll Free 1-866-313-6300
www.hchealth.org
Facebook: www.facebook.com/hocohealth

RECEIPT DATE: 2/4/22 **ONSITE SEWAGE DISPOSAL SYSTEM** P 570944
 APPROVAL DATE: 6/9/22 (50) **PERMIT: CONSTRUCTION** A _____
 PROPERTY ADDRESS: 3651 FOLLY QUARTER ROAD, ELLICOTT CITY, MD 21042
 SUBDIVISION: FOXLEIGH (frmr. HYMAN PROPERTY, Parcel 140) LOT: ---- TAX ID: 03-340627
 CONTRACTOR: WTC CONTRACTORS, INC. EMAIL: _____
 CONTRACTOR ADDRESS: 3033 SALEM BOTTOM ROAD, WESTMINSTER, MD 21157 PHONE: (410)875-9771
 PROPERTY OWNER: CBI HOMES, LLC EMAIL: pwalter@catonsvillehomes.com
 OWNER ADDRESS: 11175 STRATFIELD COURT, MARRIOTTSVILLE, MD 21104 PHONE: (410)442-2215
 SEPTIC TANK SIZE (GALLONS): 2000 TANK MANUFACTURER: TBD
 PUMP MODEL: GOULDS WE-10H PUMP SIZE 1.0 Hp PUMP TANK CAPACITY: 1500

DISTRIBUTION SYSTEM: GRAVITY PRESSURE DOSED BEDROOMS: 5 APPLICATION RATE: 1.2

TRENCHES:	LINEAR FEET REQUIRED: <u>88</u>	INLET DEPTH: <u>2.5</u>
	TRENCH WIDTH: <u>3</u>	MAXIMUM BOTTOM DEPTH: <u>6.5</u>
	MINIMUM SPACE BETWEEN TRENCHES: <u>11</u>	EFFECTIVE AREA BEGINNING DEPTH: <u>2.5</u>

LOCATION: **PER APPROVED SITE PLAN. SEWAGE DISPOSAL AREA AND TANK LOCATIONS MUST BE STAKED BY LICENSED SURVEYOR PRIOR TO PRE-CONSTRUCTION INSPECTION.**

NOTES: **ANCHOR SEPTIC TANK AND PUMP TANK.
WATERTIGHT TEST SEPTIC TANK AND PUMP TANK.
THE INSTALLED SYSTEM MUST PASS A PUMP & ALARM TEST PRIOR TO FINAL APPROVAL OF THIS PERMIT AND HEALTH DEPARTMENT APPROVAL FOR USE & OCCUPANCY**

ISSUED BY: R BRICKER ISSUE DATE: 3/23/22 EXPIRATION DATE: 2/4/22

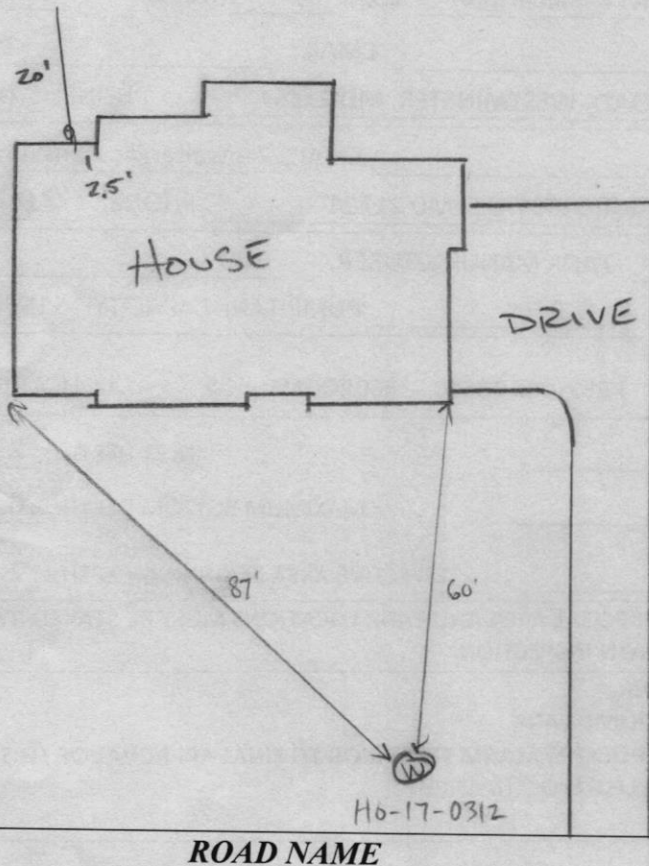
- NOTE: CONTRACTOR MUST SCHEDULE A PRE-CONSTRUCTION INSPECTION PRIOR TO BEGINNING ANY INSTALLATION
- NOTE: CONTRACTOR MUST SCHEDULE AN INSPECTION AND GAIN APPROVAL OF ALL COMPONENTS PRIOR TO COVERING
- NOTE: STONE MUST BE APPROVED BY HEALTH DEPARTMENT AND GRAVEL TICKET MUST BE AVAILABLE FOR REVIEW.
- NOTE: WATERTIGHT TANKS REQUIRED
- NOTE: ALL PARTS OF SEPTIC SYSTEM SHALL BE AT LEAST 100 FEET DOWNGRADIENT FROM ANY WATER WELL
- NOTE: MANHOLE RISERS REQUIRED ON ALL SEPTIC TANKS AND PUMP CHAMBERS
- NOTE: **AN ELECTRICAL PERMIT IS REQUIRED FOR INSTALLATION OF ANY ELECTRICAL COMPONENTS OF THE SYSTEM**
 ELECTRICAL PERMIT ISSUED E 22000004
- NOTE: **MDE RECOMMENDS SEPTIC TANKS, BAT, AND OTHER PRETREATMENT UNITS BE PUMPED AT A FREQUENCY ADEQUATE TO ENSURE THAT SOLIDS ARE NOT DISCHARGED TO THE DISPOSAL AREA**

**NEITHER THE HOWARD COUNTY COUNCIL NOR THE HEALTH DEPARTMENT IS RESPONSIBLE FOR THE SUCCESSFUL OPERATION OF ANY SYSTEM.
 PERMITTEE RESPONSIBLE FOR OBTAINING FINAL APPROVAL ON THIS PERMIT.
 CALL 410-313-1771 TO SCHEDULE INSPECTIONS.**

3651 Folly Quarter

*see attached ↑

NOT TO SCALE



TRENCH/DRAINFIELD DATA		
WIDTH	INLET	BOTTOM
3'	2.5'	6.5'
NUMBER OF TRENCHES		2
TOTAL LENGTH		90'
ABSORPTION AREA		270 sq ft + sidewalk
DISTRIBUTION BOX LEVEL		PUMP
DISTRIBUTION BOX BAFFLE		CONC
DISTRIBUTION BOX PORT		YES

SEPTIC TANK DATA	
SEPTIC TANK I LEVEL	YES
MANUFACTURER	BABYLON
CAPACITY	2000 GAL
SEAM LOC	TOP
TANK LID DEPTH	~2.5'
BAFFLES	YES
BAFFLE FILTER	-
MANHOLE LOC	FRONT/BACK
6" PORT LOC	-
WATERTIGHT TEST	VACUUM
SLOTTED	YES
DATE ON LID	01/15/2022
PUMP/SEPTIC TANK LEVEL YES	
MANUFACTURER	BABYLON
CAPACITY	1500 GAL
SEAM LOC	TOP
TANK LID DEPTH	~2.5'
BAFFLES	-
BAFFLE FILTER	-
MANHOLE LOC	FRONT/BACK
6" PORT LOC	-
WATERTIGHT TEST	VACUUM
SLOTTED	NO
DATE ON LID	01/18/2022

TRAFFIC

PRE-CONSTRUCTION:

02/28/2022 Tank locations CONFIRMED. CONFIRMED ANCHORING AND WATER TIGHT TEST. CONFIRMED 2 x 44' TRS ON CONTOUR. Ⓢ

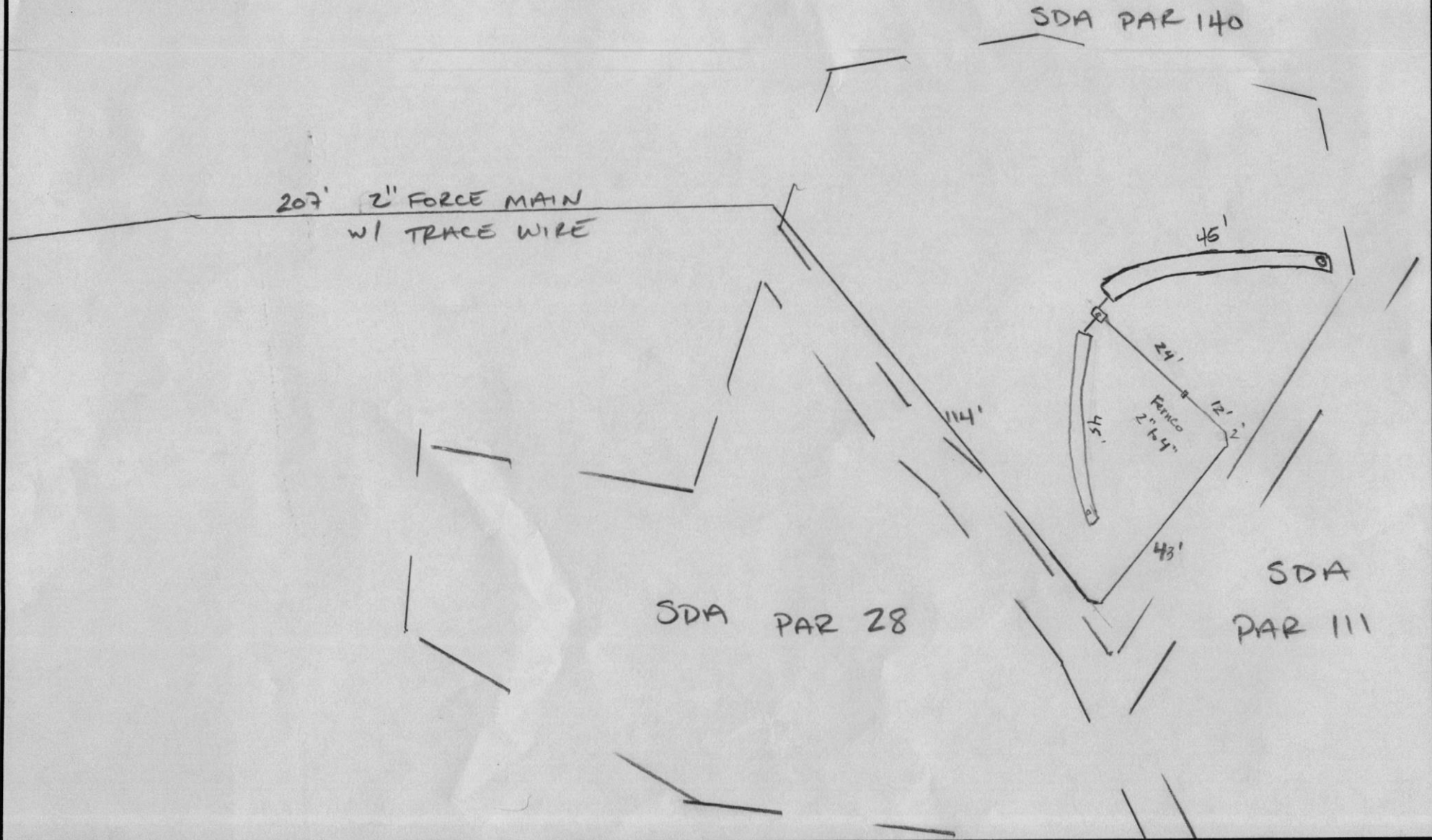
INSTALLATION:

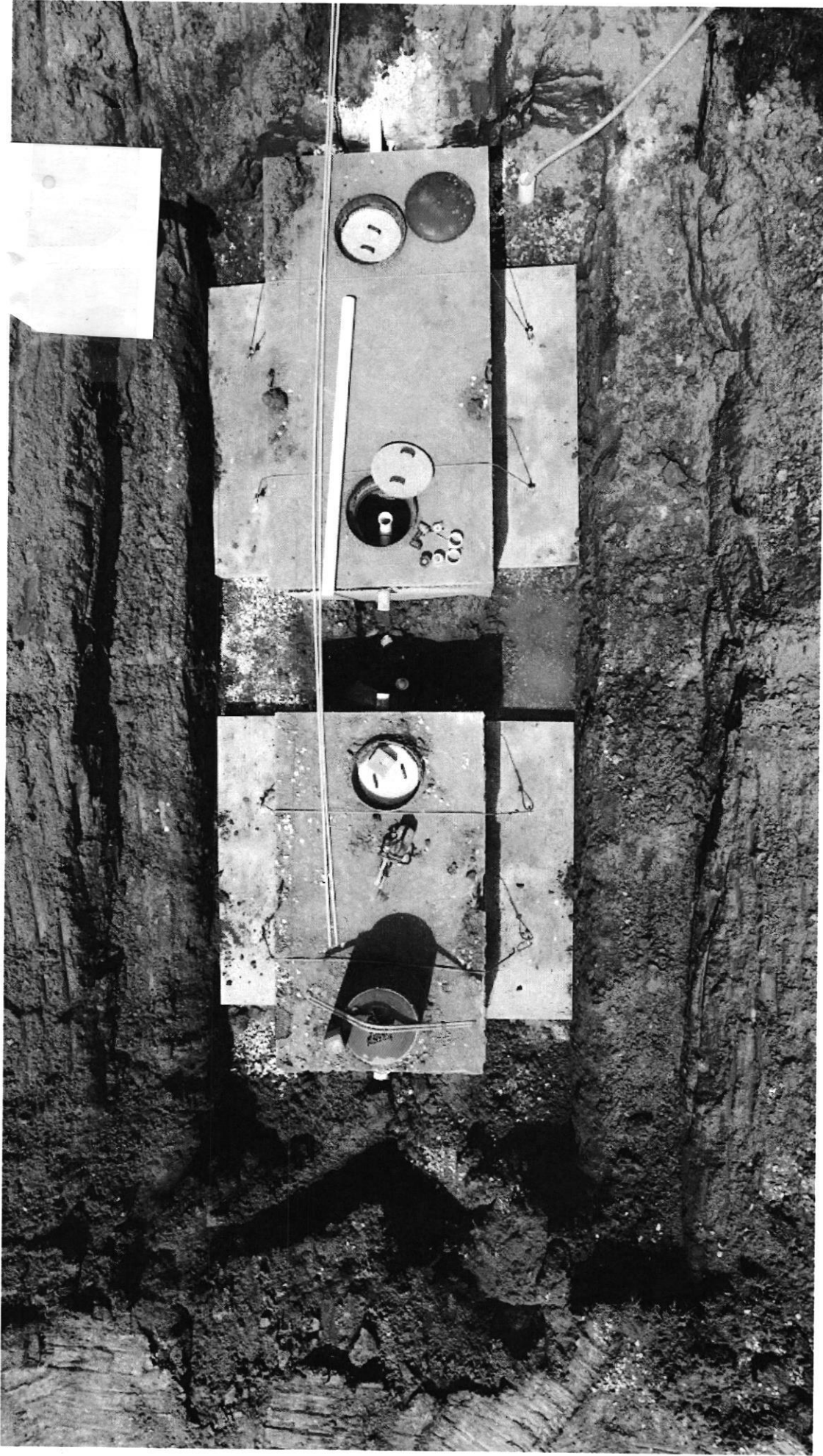
03/01/2022 INSTALLED FORCE MAIN W TRACE TAPE; INSTALLED SEWER LINE + SHC. Ⓢ 3/2/22 Installed force main changing from 2" to 4" pipe (via Fernco) as it falls to box. 1 x 45' trench installed. D-box set Ⓢ
 03/03/2022 TRS COMPLETE; TANKS SET. Ⓢ 3/4/22 Vacuum tests conducted on both tanks. Pump tank held 5" and 5.3" mercury on two different gauges from 10:20-10:25 AM. Septic tank held 4" and 5" of mercury on different gauges from 10:52-10:57 AM. Both tanks have normal 4" lids. Tanks have additional tar around lids. Ⓢ
 04/21/2022 TANKS RELOCATED & ANCHORED. Ⓢ 06/09/2022 PIA OK. Ⓢ

FINAL INSPECTOR Jan Chang DATE OF APPROVAL 06/09/2022

3651 FOLLY QUARTER

NOT TO SCALE SEPTIC ON PAR 112

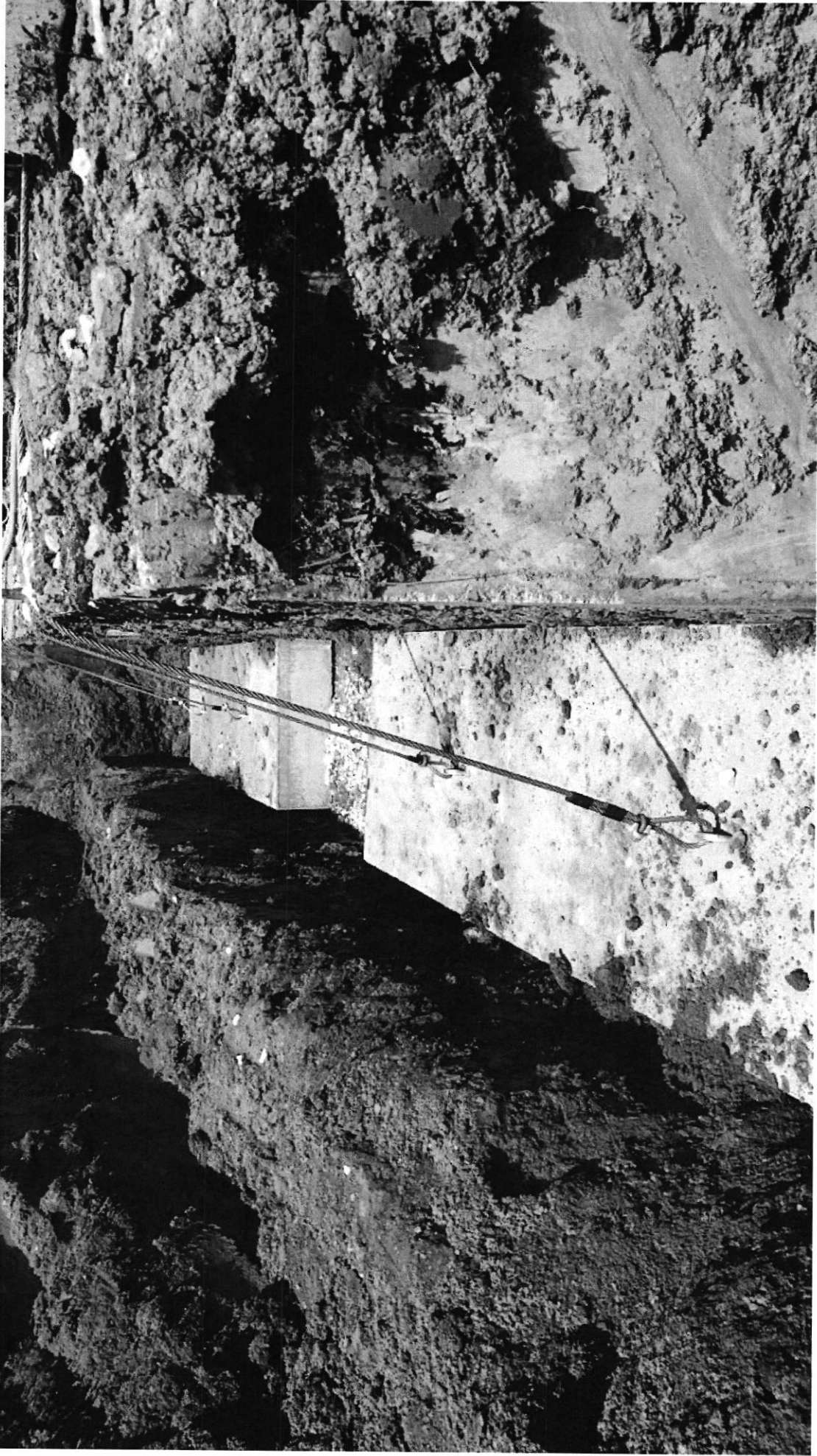




04/21/2022
3651 FOLLY QUARTER ROAD
TANK RELOCATION
POST PRESSURE TEST

04/21/2022
3651 FOLLY QUARTER ROAD
TANK ANCHOR RIGHT
(PUMP TANK OUTLET)





04/21/2022
3651 FOLLY QUARTER ROAD
TANK ANCHOR LEFT
(PUMP TANK OUTLET)



BACK RIVER PRE-CAST, LLC
PO BOX 329
GLYNDON, MD 21071
410-833-3394

LEAK TESTING CERTIFICATION

Leak testing performed in accordance with ASTM C 1227.9.2.1 – watertight integrity testing utilizing vacuum.

Date: April 20, 2022

Address: 3651 Folly Quarter Rd., Ellicott City, MD 21042

Tank #1: closest to house

Size: 2000-gallon 2 compartment septic tank

Test start time: 2:33 pm

Test finish time: 2:38 pm

Gauge # 1: 4.6 hg

Gauge # 2: 5 hg

Tank #2: furthest from house

Size: 1500-gallon pump chamber

Test start time: 2:45 pm

Test finish time: 2:50 pm

Gauge # 1: 5.4 hg

Gauge # 2: 5.6 hg

Tank manufacture: Babylon Vault, New Windsor, MD

Installer: WTC Contractors

County representative present onsite: Joseph Cabahug

I certify that above holding tanks passed vacuum testing in accordance with ASTM C 1227

Matthew Geckle

Vice-President

ANTI-FLOTATION COMPUTATIONS
FOR
FOXLEIGH PARCEL 140
SEPTIC TANK & PUMP TANK

March 3, 2022

I HEREBY CERTIFY THAT THESE DOCUMENTS
WERE PREPARED OR APPROVED BY ME, AND
THAT I AM A DULY LICENSED PROFESSIONAL
ENGINEER UNDER THE LAWS OF THE STATE
OF MARYLAND, LICENSE NO.18417,
EXPIRATION DATE: 9/18/2023



VANMAR ASSOCIATES, INC.
ENGINEERS – SURVEYORS – LANDSCAPE ARCHITECTS – PLANNERS
310 S. Main Street, Po. Box 328, Mount Airy, Maryland 21771
(301) 829-2890 (301) 831-5015 (410) 549-2751
(301) 695-0600 Fax (301) 831-5603

NARRATIVE

Septic Tank and Pump Tank Anti-Flotation

The approved On-site Sewage Disposal Plan showed a Tank Anchoring Detail. This detail was added at the request of the Health Department, however anti-flotation/buoyance computations were not completed.

The contractor has not been able to find or procure and strapping or soil anchors. As a result, Anti-Flotation Computations have been completed. Anti-Flotation computations are based on Archimedes' Principal: The buoyant force is equal to the weight of displaced water. The computations completed are based on National Precast Concrete Association calculator for Tank Buoyance.

2000 GALLON SEPTIC TANK. The computations provide a Factor of Safety of 2.0 Therefore anti-flotation tank anchoring is not required.

1500 GALLON PUMP TANK. The computations provide a Factor of Safety of 2.0 Therefore anti-flotation tank anchoring is not required.

SUMMARY

Based on the anti-flotation computations, Tank Anchoring is not necessary.

Septic Tank Computations

Rectangular Tank

*** ALL ORANGE CELLS MUST BE FILLED ***

Values for f, Ka, and e can be found in Tables 1, 2, and 3 in the accompanying document.

Disclaimer: Use of this calculator does not guarantee the proper function or performance of any product manufactured in accordance with the data herein. It is the user's responsibility to ensure their product is designed and manufactured to resist all forces applied.

Basic Dimensions		
Lid Thickness (L)	0.33	(feet)
Lid Hole Diameter (H1)	24.00	(inches)
Lid Hole Diameter (H2) - If tank has only one hole, leave blank.	24.00	(inches)
Lid Hole Diameter (H3) - If tank has only one hole, leave blank.	0.00	(inches)
Length of Tank (A)	13.75	(feet)
Width of Tank (B)	6.25	(feet)
Height of Tank Excluding Lid (C) - This value includes the base thickness but excludes the lid thickness.	5.08	(feet)
Depth of Bury (Y) - This measurement extends from the ground level to the top of the lid.	2.50	(feet)
Wall Thickness (T)	0.33	(feet)
Base Thickness (E)	0.33	(feet)
Distance to Groundwater (GW)	0.00	(feet)

Customizations To Add Ballast		
Add Concrete Inside the Tank:		
Initial Inside Height of Tank - This measurement is the value of C - E.	4.75	(feet)
Add concrete inside the tank to make thicker base?	0.00	(feet)
If yes, how much? (U) If no, enter a value of 0. Please note: The value entered must be less than the inside height of the tank.		
Increase Thickness of the Base:		
Initial Base Thickness - This measurement is the value of E.	0.33	(feet)
Add concrete below the base of the tank to make thicker base?	0.00	(feet)
If yes, how much? (F) If no, enter a value of 0.		
Create Lip:		
Extend the base horizontally to create a lip? - The lip will be the thickness of E plus F, below, and it will extend this horizontal distance, P, from all four tank walls.	0.00	(feet)

If yes, how much? (P) If no, enter a value of 0.

Summary of Final Measurements after Ballast Customizations		
Final Base Thickness - This measurement is the sum of E and F.	0.33	(feet)
Lip Thickness - This measurement is the sum of E and F.	0.33	(feet)
Total Height of the Tank from the Top of the Lid to the Bottom of the Base - This measurement is the sum of L, C, and F. This is equivalent to the sum of L, C - E, E, and F.	5.41	(feet)
Final Inside Height of Tank - This measurement is the value of C - E - U.	4.75	(feet)
Final Volume of Tank	347.57	(cf)
Final Volume of Tank	2600.02	(gallons)

Unit Weights		
Unit Weight of Water	62.40	(lb/cf)
Unit Weight of Dry Soil	110.00	(lb/cf)
Unit Weight of Submerged Soil	47.60	(lb/cf)
Unit Weight of Saturated Soil	120.00	(lb/cf)
Unit Weight of Concrete	145.00	(lb/cf)

Changes in Total Concrete Weight Due to Customizations		
Weight of extra concrete inside tank used to create thicker base (Weight of extra concrete due to U)	0	(lb)
Weight of extra concrete on bottom of tank used to create thicker base (Weight of extra concrete due to F)	0	(lb)
Weight of extra concrete due to lip (Weight of extra concrete due to P)	0	(lb)
Weight of concrete removed due to lid hole	301	(lb)

Soil and Concrete Weights		
Weight of Soil on Lid	10227	(lb)
Weight of Soil on Lip	0	(lb)
Weight of Lid Alone	3811	(lb)
Weight of Empty Tank - This value is the sum of weights of the body of the tank, the tank lid, the lip (P, if applicable), the thickened base (F, if applicable), and the extra concrete inside tank (U, if applicable), minus the weight of the concrete removed due to the hole in the lid.	16715	(lb)

Water in Tank		
Water Level in Tank - Please note: The value entered must be less than the final inside height of the tank.	4.00	(feet)
Weight of Water in Tank	18264	(lb)

Weight of System Components		
Total Weight of Soil on Tank	10227	(lb)
Total Weight of Concrete	16715	(lb)
Total Weight (Tank, Water in Tank, and Soil)	45206	(lb)

Sliding Resistance		
Specific Gravity of Soil, SG	2.75	
Friction Factor (Found in Table 1), f	0.30	
Void Ratio (Found in Table 3), e	0.59	
Ratio of Lateral to Vertical Earth Pressure (Found in Table 2), Ka	0.37	
Sliding Resistance	30037	(lb)

Uplift Force		
Uplift Force	29011.13	(lb)
Safety Factor	2.00	
Uplift Force with Safety Factor	58022.25	(lb)

Additional Ballast Required		
	NONE	(lb)

Pump Tank Computations

Rectangular Tank

*** ALL ORANGE CELLS MUST BE FILLED ***

Values for f, Ka, and e can be found in Tables 1, 2, and 3 in the accompanying document.

Disclaimer: Use of this calculator does not guarantee the proper function or performance of any product manufactured in accordance with the data herein. It is the user's responsibility to ensure their product is designed and manufactured to resist all forces applied.

Basic Dimensions		
Lid Thickness (L)	0.33	(feet)
Lid Hole Diameter (H1)	24.00	(inches)
Lid Hole Diameter (H2) - If tank has only one hole, leave blank.	0.00	(inches)
Lid Hole Diameter (H3) - If tank has only one hole, leave blank.	0.00	(inches)
Length of Tank (A)	10.92	(feet)
Width of Tank (B)	6.25	(feet)
Height of Tank Excluding Lid (C) - This value includes the base thickness but excludes the lid thickness.	5.42	(feet)
Depth of Bury (Y) - This measurement extends from the ground level to the top of the lid.	2.50	(feet)
Wall Thickness (T)	0.33	(feet)
Base Thickness (E)	0.33	(feet)
Distance to Groundwater (GW)	0.00	(feet)

Customizations To Add Ballast		
Add Concrete Inside the Tank:		
Initial Inside Height of Tank - This measurement is the value of C - E.	5.09	(feet)
Add concrete inside the tank to make thicker base?	0.00	(feet)
If yes, how much? (U) If no, enter a value of 0. Please note: The value entered must be less than the inside height of the tank.		
Increase Thickness of the Base:		
Initial Base Thickness - This measurement is the value of E.	0.33	(feet)
Add concrete below the base of the tank to make thicker base?	0.00	(feet)
If yes, how much? (F) If no, enter a value of 0.		
Create Lip:		
Extend the base horizontally to create a lip? - The lip will be the thickness of E plus F, below, and it will extend this horizontal distance, P, from all four tank walls.	0.00	(feet)

If yes, how much? (P) If no, enter a value of 0. |

Summary of Final Measurements after Ballast Customizations		
Final Base Thickness - This measurement is the sum of E and F.	0.33	(feet)
Lip Thickness - This measurement is the sum of E and F.	0.33	(feet)
Total Height of the Tank from the Top of the Lid to the Bottom of the Base - This measurement is the sum of L, C, and F. This is equivalent to the sum of L, C - E, E, and F.	5.75	(feet)
Final Inside Height of Tank - This measurement is the value of C - E - U.	5.09	(feet)
Final Volume of Tank	291.93	(cf)
Final Volume of Tank	2183.78	(gallons)

Unit Weights		
Unit Weight of Water	62.40	(lb/cf)
Unit Weight of Dry Soil	110.00	(lb/cf)
Unit Weight of Submerged Soil	47.60	(lb/cf)
Unit Weight of Saturated Soil	120.00	(lb/cf)
Unit Weight of Concrete	145.00	(lb/cf)

Changes in Total Concrete Weight Due to Customizations		
Weight of extra concrete inside tank used to create thicker base (Weight of extra concrete due to U)	0	(lb)
Weight of extra concrete on bottom of tank used to create thicker base (Weight of extra concrete due to F)	0	(lb)
Weight of extra concrete due to lip (Weight of extra concrete due to P)	0	(lb)
Weight of concrete removed due to lid hole	150	(lb)

Soil and Concrete Weights		
Weight of Soil on Lid	8122	(lb)
Weight of Soil on Lip	0	(lb)
Weight of Lid Alone	3115	(lb)
Weight of Empty Tank - This value is the sum of weights of the body of the tank, the tank lid, the lip (P, if applicable), the thickened base (F, if applicable), and the extra concrete inside tank (U, if applicable), minus the weight of the concrete removed due to the hole in the lid.	14423	(lb)

Water in Tank		
Water Level in Tank - Please note: The value entered must be less than the final inside height of the tank.	4.14	(feet)
Weight of Water in Tank	14816	(lb)

Weight of System Components		
Total Weight of Soil on Tank	8122	(lb)
Total Weight of Concrete	14423	(lb)
Total Weight (Tank, Water in Tank, and Soil)	37362	(lb)

Sliding Resistance		
Specific Gravity of Soil, SG	2.75	
Friction Factor (Found in Table 1), f	0.30	
Void Ratio (Found in Table 3), e	0.59	
Ratio of Lateral to Vertical Earth Pressure (Found in Table 2), Ka	0.37	
Sliding Resistance	28051	(lb)

Uplift Force		
Uplift Force	24488.10	(lb)
Safety Factor	2.00	
Uplift Force with Safety Factor	48976.20	(lb)

Additional Ballast Required		
	NONE	(lb)

Silvast, Zackary

From: Silvast, Zackary
Sent: Wednesday, March 9, 2022 12:42 PM
To: ron@vanmar.com
Cc: Williams, Jeffrey; Wolf, Kevin; Bricker, Robert
Subject: regarding Foxleigh/Hyman Property - 3651 Folly Quarter Ln

Hello Mr. Thompson,

This e-mail is in reference to the most recently submitted plans on March 3rd involving anti-flotation computations.

1. **After much discussion and review, we have determined that we are not going to accept this plan and we are not going to deviate from requiring anti-flotation devices for this tank.**
 - a. The calculations provided do not account for empty tanks, both 2000 GAL and 1500 GAL (for pump).
 - b. The long, multi-paged calculations were also confusing and hard to follow at times. We don't have the time or resources to spend on something this complex verifying all the data that was provided is also correct.
 - c. I took some of the information provided and ran my own calculations; these numbers did not match the computations that were provided. (And I am not claiming to be an anti-flotation expert by any means)
2. **We have to account not just for tanks being lifted out of the ground, but also for any kind of unwarranted movement. The tanks could tip, crack, or jar around.**
 - a. If both tanks got serviced and pumped out. They should be able to stay in place and should not be subjected to unforeseen movement.
3. **After a few phone calls with "Shorty" a local septic contractor last Friday, it was apparent to me that whatever is decided as a game plan moving forward out in the field should be shown accurately and match what is on the site plan. If the previously approved plans, prior to this 3/3/22 submission, are chosen as the installation guideline then that's fine. Any other ideas should be ironed out between the engineer and the hired installer, while keeping the tank manufacturer in mind also if there are proposed alterations to a tank's integrity under normal conditions.**

I hope this e-mail has provided some frame of reference and whichever decision is made will be done efficiently and swiftly. Thank you.

- ZS

Zack Silvast (LEHS)

Plan Supervisor - Water & Sewer Division

410-313-1777

Environmental Health Bureau

Howard County Health Department

LETTER OF TRANSMITTAL

AGENCY CLIENT FILE BILLING CORESPONDANCE OTHER _____

VanMar Associates, Inc.

Engineers ~ Surveyors ~ Planners
310 South Main Street, P.O.Box 328, Mt. Airy, MD 21771
301-829-2890 301-831-5015 301-695-0600
410-549-2751 (FAX) 301-831-5603

TO:

Howard County Department of
Environmental Health
8930 Stanford Blvd
Columbia, Maryland 21045

Attn: Kevin Wolf

Date: March 3, 2022

Project: Hyman Property, Parcel 140
Folly Quarter Road

VMA Job# B95821

ENCLOSED:

COPIES	DATE	DESCRIPTION
1	3/3/22	Anti-Flotation Computation
4	3/3/22	REDLINE On Site Sewage Disposal System Design Plan, Hyman Property, Parcel 140

REMARKS: Hi Kevin, revised to reflect your comments. Thank You!

COPIES TO (ADDRESS): CBI HOMES, LLC 112 S Main St, Mount Airy, MD 21771

SUBMITTED BY : dkv

G: engr:s. B85821 hd OSSD redline to kevin 3.3.22

ANTI-FLOTATION COMPUTATIONS

FOR

FOXLEIGH PARCEL 140

SEPTIC TANK & PUMP TANK

March 3, 2022

I HEREBY CERTIFY THAT THESE DOCUMENTS
WERE PREPARED OR APPROVED BY ME, AND
THAT I AM A DULY LICENSED PROFESSIONAL
ENGINEER UNDER THE LAWS OF THE STATE
OF MARYLAND, LICENSE NO.18417,
EXPIRATION DATE: 9/18/2023



VANMAR ASSOCIATES, INC.
ENGINEERS – SURVEYORS – LANDSCAPE ARCHITECTS – PLANNERS
310 S. Main Street, Po. Box 328, Mount Airy, Maryland 21771
(301) 829-2890 (301) 831-5015 (410) 549-2751
(301) 695-0600 Fax (301) 831-5603

NARRATIVE

Septic Tank and Pump Tank Anti-Flotation

The approved On-site Sewage Disposal Plan showed a Tank Anchoring Detail. This detail was added at the request of the Health Department, however anti-flotation/buoyance computations were not completed.

The contractor has not been able to find or procure and strapping or soil anchors. As a result, Anti-Flotation Computations have been completed. Anti-Flotation computations are based on Archimedes' Principal: The buoyant force is equal to the weight of displaced water. The computations completed are based on National Precast Concrete Association calculator for Tank Buoyance.

2000 GALLON SEPTIC TANK. The computations provide a Factor of Safety of 2.0 Therefore anti-flotation tank anchoring is not required.

1500 GALLON PUMP TANK. The computations provide a Factor of Safety of 2.0 Therefore anti-flotation tank anchoring is not required.

SUMMARY

Based on the anti-flotation computations, Tank Anchoring is not necessary.

Septic Tank Computations

Rectangular Tank

*** ALL ORANGE CELLS MUST BE FILLED ***

Values for f, Ka, and e can be found in Tables 1, 2, and 3 in the accompanying document.

Disclaimer: Use of this calculator does not guarantee the proper function or performance of any product manufactured in accordance with the data herein. It is the user's responsibility to ensure their product is designed and manufactured to resist all forces applied.

Basic Dimensions		
Lid Thickness (L)	0.33	(feet)
Lid Hole Diameter (H1)	24.00	(inches)
Lid Hole Diameter (H2) - If tank has only one hole, leave blank.	24.00	(inches)
Lid Hole Diameter (H3) - If tank has only one hole, leave blank.	0.00	(inches)
Length of Tank (A)	13.75	(feet)
Width of Tank (B)	6.25	(feet)
Height of Tank Excluding Lid (C) - This value includes the base thickness but excludes the lid thickness.	5.08	(feet)
Depth of Bury (Y) - This measurement extends from the ground level to the top of the lid.	2.50	(feet)
Wall Thickness (T)	0.33	(feet)
Base Thickness (E)	0.33	(feet)
Distance to Groundwater (GW)	0.00	(feet)

Customizations To Add Ballast		
Add Concrete Inside the Tank:		
Initial Inside Height of Tank - This measurement is the value of C - E.	4.75	(feet)
Add concrete inside the tank to make thicker base?	0.00	(feet)
If yes, how much? (U) If no, enter a value of 0. Please note: The value entered must be less than the inside height of the tank.		
Increase Thickness of the Base:		
Initial Base Thickness - This measurement is the value of E.	0.33	(feet)
Add concrete below the base of the tank to make thicker base?	0.00	(feet)
If yes, how much? (F) If no, enter a value of 0.		
Create Lip:		
Extend the base horizontally to create a lip? - The lip will be the thickness of E plus F, below, and it will extend this horizontal distance, P, from all four tank walls.	0.00	(feet)

If yes, how much? (P) If no, enter a value of 0.

Summary of Final Measurements after Ballast Customizations		
Final Base Thickness - This measurement is the sum of E and F.	0.33	(feet)
Lip Thickness - This measurement is the sum of E and F.	0.33	(feet)
Total Height of the Tank from the Top of the Lid to the Bottom of the Base - This measurement is the sum of L, C, and F. This is equivalent to the sum of L, C - E, E, and F.	5.41	(feet)
Final Inside Height of Tank - This measurement is the value of C - E - U.	4.75	(feet)
Final Volume of Tank	347.57	(cf)
Final Volume of Tank	2600.02	(gallons)

Unit Weights		
Unit Weight of Water	62.40	(lb/cf)
Unit Weight of Dry Soil	110.00	(lb/cf)
Unit Weight of Submerged Soil	47.60	(lb/cf)
Unit Weight of Saturated Soil	120.00	(lb/cf)
Unit Weight of Concrete	145.00	(lb/cf)

Changes in Total Concrete Weight Due to Customizations		
Weight of extra concrete inside tank used to create thicker base (Weight of extra concrete due to U)	0	(lb)
Weight of extra concrete on bottom of tank used to create thicker base (Weight of extra concrete due to F)	0	(lb)
Weight of extra concrete due to lip (Weight of extra concrete due to P)	0	(lb)
Weight of concrete removed due to lid hole	301	(lb)

Soil and Concrete Weights		
Weight of Soil on Lid	10227	(lb)
Weight of Soil on Lip	0	(lb)
Weight of Lid Alone	3811	(lb)
Weight of Empty Tank - This value is the sum of weights of the body of the tank, the tank lid, the lip (P, if applicable), the thickened base (F, if applicable), and the extra concrete inside tank (U, if applicable), minus the weight of the concrete removed due to the hole in the lid.	16715	(lb)

Water in Tank		
Water Level in Tank - Please note: The value entered must be less than the final inside height of the tank.	4.00	(feet)
Weight of Water in Tank	18264	(lb)

Weight of System Components		
Total Weight of Soil on Tank	10227	(lb)
Total Weight of Concrete	16715	(lb)
Total Weight (Tank, Water in Tank, and Soil)	45206	(lb)

Sliding Resistance		
Specific Gravity of Soil, SG	2.75	
Friction Factor (Found in Table 1), f	0.30	
Void Ratio (Found in Table 3), e	0.59	
Ratio of Lateral to Vertical Earth Pressure (Found in Table 2), Ka	0.37	
Sliding Resistance	30037	(lb)

Uplift Force		
Uplift Force	29011.13	(lb)
Safety Factor	2.00	
Uplift Force with Safety Factor	58022.25	(lb)

Additional Ballast Required		
	NONE	(lb)

Pump Tank Computations

Rectangular Tank

*** ALL ORANGE CELLS MUST BE FILLED ***

Values for f, Ka, and e can be found in Tables 1, 2, and 3 in the accompanying document.

Disclaimer: Use of this calculator does not guarantee the proper function or performance of any product manufactured in accordance with the data herein. It is the user's responsibility to ensure their product is designed and manufactured to resist all forces applied.

Basic Dimensions		
Lid Thickness (L)	0.33	(feet)
Lid Hole Diameter (H1)	24.00	(inches)
Lid Hole Diameter (H2) - If tank has only one hole, leave blank.	0.00	(inches)
Lid Hole Diameter (H3) - If tank has only one hole, leave blank.	0.00	(inches)
Length of Tank (A)	10.92	(feet)
Width of Tank (B)	6.25	(feet)
Height of Tank Excluding Lid (C) - This value includes the base thickness but excludes the lid thickness.	5.42	(feet)
Depth of Bury (Y) - This measurement extends from the ground level to the top of the lid.	2.50	(feet)
Wall Thickness (T)	0.33	(feet)
Base Thickness (E)	0.33	(feet)
Distance to Groundwater (GW)	0.00	(feet)

Customizations To Add Ballast		
Add Concrete Inside the Tank:		
Initial Inside Height of Tank - This measurement is the value of C - E.	5.09	(feet)
Add concrete inside the tank to make thicker base?	0.00	(feet)
If yes, how much? (U) If no, enter a value of 0. Please note: The value entered must be less than the inside height of the tank.		
Increase Thickness of the Base:		
Initial Base Thickness - This measurement is the value of E.	0.33	(feet)
Add concrete below the base of the tank to make thicker base?	0.00	(feet)
If yes, how much? (F) If no, enter a value of 0.		
Create Lip:		
Extend the base horizontally to create a lip? - The lip will be the thickness of E plus F, below, and it will extend this horizontal distance, P, from all four tank walls.	0.00	(feet)

If yes, how much? (P) If no, enter a value of 0.

Summary of Final Measurements after Ballast Customizations		
Final Base Thickness - This measurement is the sum of E and F.	0.33	(feet)
Lip Thickness - This measurement is the sum of E and F.	0.33	(feet)
Total Height of the Tank from the Top of the Lid to the Bottom of the Base - This measurement is the sum of L, C, and F. This is equivalent to the sum of L, C - E, E, and F.	5.75	(feet)
Final Inside Height of Tank - This measurement is the value of C - E - U.	5.09	(feet)
Final Volume of Tank	291.93	(cf)
Final Volume of Tank	2183.78	(gallons)

Unit Weights		
Unit Weight of Water	62.40	(lb/cf)
Unit Weight of Dry Soil	110.00	(lb/cf)
Unit Weight of Submerged Soil	47.60	(lb/cf)
Unit Weight of Saturated Soil	120.00	(lb/cf)
Unit Weight of Concrete	145.00	(lb/cf)

Changes in Total Concrete Weight Due to Customizations		
Weight of extra concrete inside tank used to create thicker base (Weight of extra concrete due to U)	0	(lb)
Weight of extra concrete on bottom of tank used to create thicker base (Weight of extra concrete due to F)	0	(lb)
Weight of extra concrete due to lip (Weight of extra concrete due to P)	0	(lb)
Weight of concrete removed due to lid hole	150	(lb)

Soil and Concrete Weights		
Weight of Soil on Lid	8122	(lb)
Weight of Soil on Lip	0	(lb)
Weight of Lid Alone	3115	(lb)
Weight of Empty Tank - This value is the sum of weights of the body of the tank, the tank lid, the lip (P, if applicable), the thickened base (F, if applicable), and the extra concrete inside tank (U, if applicable), minus the weight of the concrete removed due to the hole in the lid.	14423	(lb)

Water in Tank		
Water Level in Tank - Please note: The value entered must be less than the final inside height of the tank.	4.14	(feet)
Weight of Water in Tank	14816	(lb)

Weight of System Components		
Total Weight of Soil on Tank	8122	(lb)
Total Weight of Concrete	14423	(lb)
Total Weight (Tank, Water in Tank, and Soil)	37362	(lb)

Sliding Resistance		
Specific Gravity of Soil, SG	2.75	
Friction Factor (Found in Table 1), f	0.30	
Void Ratio (Found in Table 3), e	0.59	
Ratio of Lateral to Vertical Earth Pressure (Found in Table 2), Ka	0.37	
Sliding Resistance	28051	(lb)

Uplift Force		
Uplift Force	24488.10	(lb)
Safety Factor	2.00	
Uplift Force with Safety Factor	48976.20	(lb)

Additional Ballast Required		
	NONE	(lb)